9.0 SOCIOECONOMICS

This section provides a qualitative evaluation of potential cumulative effects to socioeconomics from existing and proposed mines within the study area. Because of the complex interrelationships of surface and ground water variables, and soil composition, geologic, climatological, and geochemical variables (see Section 3.2), all of which are influential on hydrologic impacts, it is not possible, with any degree of certainty, to identify the extent to which social and economic impacts may occur. However, more than 50 mitigation measures have been proposed by the proponents of these mining operations as part of their plans of operations. These mitigation measures, discussed on pages 1-9 through 1-12, have been designed specifically to ameliorate and alleviate economic impacts that may occur. It is, therefore, not expected that any economic losses will be sustained. Potential economic impacts have been identified and are addressed as part of this analysis as follows:

- Effects on water users and water-dependent natural resources due to reduction in surface water quantity and ground water quantity and levels;
- Impacts to irrigators as a result of increased flow in the Humboldt River during mine discharge, and decreased flow in the river after cessation of mine discharge;
- Effects on water users and water-dependent natural resources due to changes in surface and ground water quality;
- Impacts to water users and water-dependent natural resources due to potential increases in flooding, erosion, and sedimentation associated with water management activities; and
- Effects on recreational opportunities due to changes to the hydrologic system; it is assumed that adverse and beneficial impacts on wildlife and fisheries may have socioeconomic impacts related to hunting and fishing opportunities

9.1 Affected Environment

The affected environment associated with socioeconomic-related cumulative impacts includes the mine dewatering area in the Carlin Trend and the Humboldt River Basin that would be affected by mine discharge and other activities that discharge and/or consume water. The affected environment sections in this report that describe Water Resources (3.1), Terrestrial Resources (5.1), Aquatic Resources (6.1), and Grazing Management (8.1) can be referenced for more detail.

The study area for mine dewatering encompasses the six designated ground water basins shown in Figure 3-1, including the city of Carlin and the communities of Palisade and Dunphy. Socioeconomic concerns in this area include lowered water levels in wells, reduced flow in springs (livestock and wildlife impacts), reduced streamflow (irrigation and livestock impacts), and development of sinkholes (possible damage to private property and/or natural resources).

The regional study area for the Humboldt River Basin extends from the Carlin gage on the Humboldt River downstream to the Humboldt Sink (see Figure 1-1). This area potentially could be affected by discharge and consumption of water due to mining and other activities (e.g., irrigation, municipal, industrial, and domestic uses). Socioeconomic conditions in this area related to water use, consumption, and discharge are considered for the cumulative analysis.

9.2 Impacts from Mine Dewatering and Localized Water Management Activities

Potential socioeconomic impacts that may occur in the mine dewatering area resulting from drawdown of ground water in the Carlin Trend are described in this section. Effects on ground water resources are described in Section 3.2.

9.2.1 Lowered Water Levels in Wells

Potential socioeconomic impacts associated with lowering the water level in a given well may include: increased pumping costs due to increased pumping head; need to lower the pump in the well; purchasing a new pump; and drilling a new deeper well. Specific impacts to individual wells would depend on well location, completion, depth, yield, pump type and setting depth, and water pumping levels.

Socioeconomic impacts resulting from lowered ground water levels could affect a variety of water uses, including domestic, industrial, commercial, irrigation, and stock water. Section 3.2.5 identifies the number of water rights by category of use and potential impacts to these rights. If stock water availability were reduced, permitted active grazing use (i.e., AUMs) within a grazing allotment could be reduced. Grazing permittees would likely try to find additional pasture; however, because grazing allotments are fully allocated in this area, permittees would likely reduce livestock numbers with a resultant loss in income and associated impacts on the local economy (see Chapter 8.0, Grazing Management).

9.2.2 Reduced Flow in Springs

As described in Section 3.2.4, dewatering activity could impact flow from springs hydraulically connected to the regional ground water system within the ground water drawdown area. Springs with reduced flow may affect some water sources for livestock and wildlife, resulting in socioeconomic impacts to affected livestock owners and the state's wildlife resources (e.g., big game, upland game birds. raptors, and fishery resources). Hunting and fishing opportunities could be reduced in some of the impacted areas. Species of special concern (terrestrial wildlife and aquatic life) that potentially could be affected, including the Lahontan cutthroat trout, may require additional resources by wildlife agencies to monitor and evaluate the status of these species. Springs that support domestic water supply to the city of Carlin (i.e., Carlin Cold Spring in the Marys Creek drainage) also could be affected by dewatering in the Carlin Trend. Newmont would replace the drinking water supply for the city of Carlin to offset any impacts to the Carlin Cold Spring from dewatering activities (SOAP Final EIS, Appendix A – Mitigation Plan; BLM 1993d). Therefore, there would be no measurable socioeconomic impact to the city of Carlin’s water supply as a result of dewatering activities.

9.2.3 Reduced Streamflow

Numerical model simulations used to predict changes in stream baseflow as a result of ground water drawdown show that streams in the vicinity of the Carlin Trend could decline in flow during and after cessation of mining (Figures 3-18 and 3-19), including Rock Creek, Boulder Creek, Maggie Creek, Marys Creek, and Susie Creek. The predicted reductions in baseflows in these streams and the baseflow predictions over time are described in Section 3.2.4. The maximum changes in flow rates are predicted to occur after cessation of dewatering and with the exception of lower Maggie Creek, to be followed by a gradual return to approximate premine conditions. Potential impacts to Humboldt River flow are discussed in Section 3.3.

Section 3.2.6 describes the surface water rights that have been identified within the potential cumulative ground water drawdown area (Figure 3-21 and Table 3-17), including the water rights that are for irrigation or livestock watering. Section 3.2.6 indicates that some of these water rights potentially could be affected by ground water drawdown; therefore, socioeconomic impacts could occur from reduced streamflow for these designated uses, including costs to replace irrigation and livestock watering sources.

9.2.4 Geology and Minerals

Some areas of sinkhole development have occurred in the Carlin Trend area that may be attributed to mine dewatering. Sinkholes are most likely to occur in areas where carbonate rocks are at or near the ground surface. Areas potentially susceptible to sinkhole development have been delineated in the Carlin Trend study area (see Chapter 2.0). Most of these potential sinkhole development areas are located between the Betze-Post and Gold Quarry mines. If any sinkholes develop as a result of mine dewatering, no cumulative socioeconomic impacts are expected, unless damage to private property and/or natural resources, as identified in Section 2.2.4, would require some form of corrective action.

9.3 Impacts to the Humboldt River from Mine Dewatering

This section describes potential socioeconomic impacts that may occur in the Humboldt River Basin resulting from discharges of dewatering water to the Humboldt River from the Goldstrike, Gold Quarry, Leeville, and Lone Tree mines. Based on current and proposed mining, dewatering discharges would continue until 2006, during which time flow in the Humboldt River would increase over premine conditions. After cessation of dewatering discharges, flow in the river would decline below premine conditions but would gradually recover to near premine rates; this recovery period may extend for more than 100 years.

9.3.1 Increased River Flow

Additional contributions to river flows from mine dewatering discharges are discussed in Sections 1.2 and 3.3. Since the Humboldt River is over-appropriated, the additional excess mine water would be a positive effect to water right holders in the basin. Storage of excess mine water in Rye Patch Reservoir could provide additional water for irrigation downstream of the reservoir. An additional 100 to 200 cfs in the Humboldt River is equivalent to approximately 6,000 to 12,000 acre-feet per month, some of which would be available to downstream irrigators. Table 9-1 shows irrigation water use (withdrawal and consumption) for the period 1990-2020 for the five counties that comprise the Humboldt River Basin, as predicted by the Nevada Division of Environmental Planning in 1992. As discussed in Appendix C and the footnote to Table C-1, more recent agency predictions are that agricultural withdrawals will decline for the five-county region by approximately 180,000 acre-feet per year between the years 2000 and 2020 (Nevada Division of Water Planning 1998).

Table 9-1
Irrigation Water Use Forecast (1990-2020) for the Humboldt River Basin

	Irrigation Water Use (acre-feet/year)			
County	**1990**	**2000**	**2010**	**2020**
Elko – withdrawal	956,120	996,380	1,036,480	1,076,660
Elko – consumption	513,040	534,600	556,160	557,720
Eureka – withdrawal	120,840	120,840	120,840	120,840
Eureka – consumption	73,140	73,140	73,140	73,140
Humboldt – withdrawal	432,180	432,180	432,180	432,180
Humboldt – consumption	226,380	226,380	226,380	226,380
Lander – withdrawal	155,250	161,100	167,400	173,250
Lander – consumption	82,800	85,920	89,280	92,400
Pershing – withdrawal	215,730	215,730	215,730	215,730
Pershing – consumption	110,160	110,160	110,160	110,160
State Total – withdrawal	**3,344,710**	**3,322,980**	**3,353,600**	**3,383,570**
State Total – consumption	**1,794,520**	**1,778,560**	**1,794,910**	**1,810,850**

Source: Nevada Division of Water Planning (1992b).

Higher flow in the river year-round during the period of mine dewatering also may cause increased erosion of the riverbed and banks. This erosion could encroach slightly on private property along the river. Any erosion that causes loss of land could affect current and future economic values of the land.

An additional socioeconomic impact of increased water in the Humboldt River may include limiting the ability to repair irrigation diversion structures during the low-flow periods. Irrigators typically repair these structures as needed when river flow has declined in the fall. The increased flow from mine discharges may cause more water to be in contact with the irrigation structures on a year-round basis and make it more difficult to perform the necessary repairs. If irrigation structures cannot be repaired during low-flow periods, the cost to access and repair the structures may increase.

9.3.2 Reduced River Flow

Based on numerical model results, the maximum predicted reduction in baseflow of the Humboldt River would occur near the end of dewatering operations. The long-term decrease in Humboldt River base flow could extend for a period of more than 100 years. Refer to Section 3.3.2 for a description of impacts to surface flow in the Humboldt River.

As described in Section 3.1.3.1 and Appendix C, irrigation and livestock watering are the dominant uses of water (over 80 percent) in the Humboldt River Basin (Tables 9-1 and 9-2). Approximately 250,000 acres are irrigated in the basin (2.3 percent of basin area). According to the Nevada State Engineer's Office, appropriations for water in the Humboldt River Basin total approximately 609,000 acres. Potential decreases in baseflow resulting from dewatering activity would impact irrigation, especially during low-flow months. Most of the water withdrawal for irrigation activity occurs in the earlier part of the growing season (about 75 percent of irrigation water is withdrawn between mid-March and mid-June). Impacts due to decreases in river flow would be lessened during this period because natural flow in the river is relatively high. The ability for some agricultural operations to irrigate late season hay or to water livestock may be limited by decreases in flow. Specific irrigators with more junior water rights may be adversely affected. In response to the potential effects of decreased river flows, Newmont has committed to augmenting low flows using its senior water rights (BLM 1993d). A summary of this mitigation is provided in Section 3.3.2.

Table 9-2
Stock Water Use Forecast (1990-2020) for the Humboldt River Basin

County	Stock Water Use (acre-feet/year)			
	1990	2000	2010	2020
Elko – withdrawal	4,277	4,367	4,457	4,547
Elko – consumption	2,555	2,610	2,665	2,720
Eureka – withdrawal	358	476	593	711
Eureka – consumption	214	284	355	426
Humboldt – withdrawal	1,613	1,647	1,681	1,715
Humboldt – consumption	966	986	1,007	1,027
Lander – withdrawal	861	818	774	731
Lander – consumption	515	489	463	437
Pershing – withdrawal	669	688	708	727
Pershing – consumption	396	409	421	433
State Total – withdrawal	**13,694**	**14,006**	**14,318**	**14,630**
State Total – consumption	**8,182**	**8,374**	**8,566**	**8,758**

Source: Nevada Division of Water Planning 1992b.

9.3.3 Water Quality Impacts

As discussed in Section 3.3.8, mine discharges to the Humboldt River could increase loads and possibly concentrations of inorganic constituents in the river and Humboldt and Carson sinks. Economic conditions would not be affected by potential increased chemical loads to the Humboldt River and Humboldt Sink.